Appropriateness of Antibiotic Prophylaxis in Gynecologic Surgery at Srinagarind Hospital

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Objective: *To evaluate the rate of appropriate prophylactic antibiotic use in gynecologic surgery at Srinagarind Hospital.*
Design study: *Prospective descriptive study.*
Setting: *Srinagarind Hospital, Khon Kaen University, Thailand*
Material and Method: *Medical records of 250 women who had undergone gynecologic surgery at Srinagarind Hospital during August 2004 and February 2005 were evaluated. The criteria of appropriate prophylactic antibiotics were based on ACOG recommendation 2001. Data on demographic information, surgery procedure and antibiotic use during surgery were extracted from these medical records and analyzed.*
Main outcomes: *Rate of appropriate prophylactic antibiotic use and type of inappropriate use.*
Results: *Two hundred and fifty women had undergone gynecologic surgery during the study period. There were 168 total abdominal hysterectomy (TAH), 12 vaginal hysterectomy (VH), 30 salpingooophorectomy (SO), 3 myomectomy, 30 diagnostic laparoscopy and 7 laparoscopic ovarian cystectomy (LOC). Twenty private staff and twenty residents conducted these operations. The overall rate of appropriate prophylactic antibiotic use was 75.2% (95%CI 69.28-80.33). Main type of inappropriate use were multiple doses and indication not fulfilled. The overall rate of appropriate antibiotic prophylaxis among surgeries conducted by private staff was 53.19% (95%CI 42.66-63.46) and the overall rate of appropriate antibiotic prophylaxis among surgeries conducted by residents was 88.46% (95%CI 82.13-93.83). The rate of early post operative infection between both groups was not different (p = 0.529). There was no drug complication in all subjects.*
Conclusion: *The overall rate of appropriate antibiotic prophylaxis in gynecologic surgery at Srinagarind Hospital was 75.2% (95%CI 69.28-80.33). Residents used prophylactic antibiotics more appropriately than private staff.*

Keywords: *Prophylactic antibiotics, Gynecologic surgery, Total abdominal hysterectomy, Vaginal hysterectomy, Salpingooophorectomy, Diagnostic laparoscopy, Llaparoscopic ovarian cystectomy*

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Most gynecologic operations were classified as 'clean-contaminated' wound. Preoperative antibiotic prophylaxis can reduce post operative infection rate but cannot eliminate serious post operative infections. Overall, post operative infection rate in gynecologic surgery was reported about 5-10%. The infection rate was increased in the presence of risk factors such as gross contamination at operative site, massive blood loss, obesity or prolonged operative time[1]. Inappropriate antibiotic use can waste resources and increases risk of resistant organisms.

The American College of Obstetricians and Gynecologists (ACOG) and the American Society of Health-System Pharmacists recommended a single-dose antibiotic prophylactic protocols (such as cephalosporin, ampicillin, gentamicin, metronidazole, quinolone group) 30 minutes prior to surgery and to repeat the dose when the operative time is more than 3 hours

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or there is more than 3 liters of blood loss in abdominal hysterectomy (TAH), vaginal hysterectomy (VH), and myomectomy procedure. However, there was no recommendation in salpingooophorectomy (SO), diagnostic laparoscopy, and laparoscopic ovarian cystectomy (LOC)[2]. Several studies confirmed that antibiotic prophylaxis as in ACOG recommendation 2001 can reduce the post operative infection and the complication rate[3-9].

At Srinagarind Hospital, there were various regimen of antibiotic prophylaxis in gynecologic surgery. However, there was no antibiotic prophylaxis guideline. Therefore, the authors studied the appropriate use of prophylaxis antibiotic. The results of the present study can be considered in the development of antibiotic prophylaxis guideline.

The objectives of the present study were to evaluate the rate of appropriate antibiotic prophylaxis use in gynecologic surgery, the type of inappropriate use, the early post operative infections, and the antibiotic allergy at Srinagarind Hospital.

Material and Method

The present study was approved by the Ethics Committee of the Faculty of Medicine, Khon Kaen University. The sample size was calculated by using the formula for descriptive study. Because no previous study was performed, the medical records of women who had undergone gynecologic surgery between January 2004 and February 2004 were evaluated for the pilot study. The authors found 86 women who received appropriate prophylactic antibiotic use. Therefore, the sample size should be 250 subjects at least. The authors consecutively recruited 250 women who had undergone gynecologic surgery at the Department of Obstetrics and Gynecology, Srinagarind Hospital, Khon Kaen University, between August 2004 and February 2005.

Inclusion criteria were women who received elective gynecologic surgery. The surgeries of the present study were TAH, VH, myomectomy, SO, diagnostic laparoscopy and LOC. Exclusion criteria were: 1) women who received oncologic gynecology surgery 2) emergency cases 3) women who had tuboovarian abscess (TOA) or any infection before surgery 4) women who had underlying heart diseases.

Patient's demographic data, details of surgical procedures, antibiotic using during surgery and data from the surgeon interviewing about the reason of inappropriate antibiotic using were extracted from their medical records.

Definitions: Appropriate use of antibiotic prophylaxis was defined as in ACOG recommendation 2001, other antibiotic use were defined as inappropriate.

Main outcomes were the rate of appropriate prophylactic antibiotic use and type of inappropriate use. Secondary outcomes were 1) febrile morbidity 2) any post operative infections such as wound infection, urinary tract infection etc. 3) antibiotic allergy. All data were analyzed and reported in means and standard deviations (SD).

Results

Two hundred and fifty women underwent surgery during the study period. The mean age was 42.43 years (SD 9.87 years), mean BMI was 25.13 kg/M^2 (SD 3.18 kg/M^2).There were 16 women who had medical diseases (3 were diabetic mellitus (DM), 5 were hypertension (HT), 5 were coexisting HT and DM and 3 were thyroid disease). The mean duration of preoperative days was 2.37 days, mean duration of post operative days was 4.07 days. The mean operative time was 90 minutes and mean estimated blood loss was 299 milliliters (Table 1). The surgical operations were 168 TAH, 12 VH, 30 SO, 3 myomectomy, 30 diagnostic laparoscopy, and 7 LOC (Table 2). Twenty private staff and twenty residents conducted these operations. Table 3

Table 1. Details of operations (n =250)

Characteristics	Mean $\pm$ SD
Number of preoperative days	2..37 $\pm$ 1.94
Number of postoperative days	4.07 $\pm$ 0.76
Operative time (minutes)	90.78 $\pm$ 37.15
Estimate blood loss (milli-liters)	299.60 $\pm$ 317.46
Surgeon (No.,%)	
Private staff	94 (37.6%)
Residents	156 (62.4%)

Table 2. Type of operations

Type	No. (%)
Total abdominal hysterectomy	168 (67.2)
Vaginal hysterectomy	12 (4.8)
Myomectomy	3 (1.2)
Salpingooophorectomy	30 (12.0)
Diagnostic laparoscopy	30 (12.0)
Laparoscopic ovarian cystectomy	7 (2.8)
Total	250 (100.0)

Table 3. Appropriateness of antibiotic prophylaxis using

Surgeons	No. (%)	95% confidence interval
Overall	250 (100.00)	
- Appropriate	188 (75.20)	69.28-80.33
- Inappropriate	62 (24.80)	19.67-30.72
Private staff	94 (100.00)	
- Appropriate	50 (53.19)	42.66-63.46
- Inappropriate	44 (46.81)	43.54-57.34
Multiple doses	22 (50.00)	34.79-65.21
Not fulfill indication	22 (50.00)	34.79-65.21
Residents	156 (100.00)	
- Appropriate	138 (88.46)	82.13-93.83
- Inappropriate	18 (11.54)	7.17-17.87
Multiple doses	3 (16.67)	4.41-42.27
Not fulfill indication	15 (83.33)	57.73-95.59
Total	250 (100.00)	

shows the appropriate use of antibiotic prophylaxis. The overall rate of appropriate prophylactic antibiotic use was 75.20% (95%CI 69.28-80.33). The main types of inappropriate use were the use without indication and multiple doses.

The rates in the appropriate antibiotic group were 85.12% in TAH, 100% in VH, 16.67% in SO, 83.33% in diagnostic laparoscopy, and 0% in LOC. The overall rate of appropriate antibiotic use among operative procedures that were conducted by private staff was 53.19% (95%CI 42.66-63.46) detailed as 62.71% in TAH, 100% in myomectomy 14.29% in SO, 75.00% in diagnostic laparoscopy and 0% in LOC. No women had undergone vaginal hysterectomy by private staff. The overall rate of appropriate antibiotic use in operative procedures that were conducted by residents was 88.46% (95%CI 82.13-93.83) detailed as 97.25% in TAH, 100% in VH, 100% in myomectomy, 18.75%in SO and 88.89% in diagnostic laparoscopy. No women had undergone LOC by residents.

There was no early post operative infection among women who were operated on by private staff. Two women who were operated on by residents had got post operative infections (1 urinary tract infection and 1 wound infection). Both of them were in the appropriate antibiotic use group. The infection rate was not significantly different between the appropriate and inappropriate group. None of the patients had febrile morbidity and drug allergy.

Infection: appropriate group, 2 in 188 cases, inappropriate group 0 in 62 cases.

Discussion

The overall rate of appropriate antibiotic prophylaxis use in gynecologic surgery at Srinagarind Hospital was 75.20% (95%CI 69.28-80.33). Residents used appropriate antibiotic prophylaxis more than private staff. The rate of appropriate antibiotic prophylaxis in vaginal hysterectomy was 100% and may be due to the operators having a preexisting guideline for a long time. However, in salpingooophorectomy, myomectomy, and LOC, the appropriateness of prophylactic antibiotic use was low. The main types of inappropriate use were multiple doses and no indication for use. The rate of post operative infections in both groups (appropriate antibiotic prophylaxis versus inappropriate antibiotic prophylaxis) were not statistically different ($p = 0.529$). None of the subjects had a drug allergy.

The present study's results were quite similar to the study of Rattanapuntamanee O et al that reported an overall appropriate prophylactic antibiotic use rate in obstetric procedures at Srinargarind Hospital of 86.33% (95%CI 83.22-88.98). Residents used appropriate antibiotic prophylaxis more often than private staff (rate of appropriate antibiotic prophylaxis use conducted by residents was 97.42% while conducted by private staff was 70.92%). No indication used, multiple dose and antibiotic under used were the reasons of inappropriate use of antibiotic[10].

The appropriateness of antibiotic prophylaxis at the studied hospital was lower than of the one studied from India. Shah BK et al reported that appropriate

antibiotic prophylaxis in obstetric and gynecologic surgery at a tertiary care hospital in India was 95.14%[11]. However, the present study was higher than the one from Australian LeMire M et al. They reported that appropriate antibiotic prophylaxis in obstetric and gynecologic surgery at a tertiary care hospital in Australian was 65%[12]. Both studies found the most common cause of inappropriate antibiotic prophylaxis use were multiple uses and no indication, which were similar to the present study.

Both studies were similar to the present study because they studied the appropriateness of antibiotic prophylaxis in a tertiary care hospital. Rattanapuntamanee O and the present study showed that the overall rate of appropriate antibiotic use in the obstetric and gynecologic surgery at Srinagarind Hospital was less than Shah[11] study, and that the residents practiced more appropriate antibiotic prophylaxis than the private staff. The inappropriate antibiotic use was due to personal idea, attitude, and individual experience. The overuse of antibiotic prophylaxis in gynecologic surgery did not improve the rate of post operative infection and increased waste in resources. Antibiotic prophylaxis regimen in gynecologic surgery has been recommended worldwide. The inappropriate use in the study of hospital waste resources increased the drug resistance rate. To minimize these problems, the authors recommend having antibiotic prophylaxis guideline for Obstetric and Gynecologic surgery in the study department. The presented data and other evidence-based antibiotic prophylaxis in Obstetric and Gynecologic surgery can help develop guidelines.

The present study had many strengths. The authors used an appropriate study design (prospective study) and an adequate sample size to answer the research questions. The authors carefully conducted the present study to minimize bias by including all operations in the study period, using international standard criteria for appropriate prophylactic antibiotics.

The limitation of the present study was that the authors followed only early infection. A study of late infections should be conducted.

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ความเหมาะสมของการใช้ยาปฏิชีวนะเพื่อป้องกันการติดเชื้อสำหรับการผ่าตัดทางนรีเวชในโรงพยาบาลศรีนครินทร์

หลิงหลิง แซ่เตีย, โฉมพิลาศ จงสมชัย

วัตถุประสงค์*: ประเมินความเหมาะสมในการใช้ยาปฏิชีวนะในการป้องกันการติดเชื้อในการผ่าตัดทางนรีเวชที่โรงพยาบาลศรีนครินทร์*

สถานที่ทำการวิจัย*: โรงพยาบาลศรีนครินทร์*

วัสดุและวิธีการ*: ศึกษาเวชระเบียนของสตรีที่มารับการผ่าตัดทางนรีเวช ช่วงเดือน สิงหาคม พ.ศ. 2547 ถึงกุมภาพันธ์ พ.ศ. 2548 บันทึกข้อมูลพื้นฐาน วิธีการผ่าตัด การใช้ยาปฏิชีวนะในการผ่าตัด แล้วนำมาประเมินโดยใช้เกณฑ์ความเหมาะสมของการใช้ยาปฏิชีวนะเพื่อป้องกันการติดเชื้อหลังผ่าตัดที่แนะนำโดย ACOG recommendation 2001*

ตัววัดที่สำคัญ*: อัตราความเหมาะสม และชนิดของการใช้ยาปฏิชีวนะที่ไม่เหมาะสมเพื่อป้องกันการติดเชื้อในการผ่าตัดทางนรีเวช*

ผลการศึกษา*: มีสตรีที่มารับการผ่าตัดทางนรีเวชในโรงพยาบาลศรีนครินทร์ในช่วงที่ทำการศึกษาวิจัย จำนวน 250 คน แบ่งเป็นการผ่าตัดตัดมดลูกทางหน้าท้อง 168 คน ผ่าตัดตัดมดลูกทางช่องคลอด 12 คน ผ่าตัดตัดเนื้องอกมดลูก 3 คน ตัดท่อนำไข่และรังไข่ 30 คน และการผ่าตัดส่องกล้องเพื่อการวินิจฉัย 30 คน และการผ่าตัดส่องกล้องเพื่อการรักษา 7 คน ผู้ทำการผ่าตัดได้แก่ แพทย์อาวุโส 20 คน และแพทย์ใช้ทุนและแพทย์ประจำบ้าน 20 คน พบว่าอัตราความเหมาะสมของการใช้ยาปฏิชีวนะเพื่อป้องกันการติดเชื้อภายหลังการผ่าตัดโดยรวมเท่ากับร้อยละ 75.2 (95%CI 69.28-80.33) สาเหตุส่วนใหญ่ของการใช้ยาปฏิชีวนะที่ไม่เหมาะสมได้แก่ ให้ยาหลายครั้งเกินความจำเป็น ไม่มีข้อบ่งชี้ในการให้ยา อัตราความเหมาะสมของการใช้ยาปฏิชีวนะของแพทย์อาวุโสรวมคิดเป็นร้อยละ 53.19 (95%CI 42.66-63.46) ส่วนแพทย์ใช้ทุนและแพทย์ประจำบ้านมีอัตราความเหมาะสมในการใช้ยาปฏิชีวนะคิดเป็นร้อยละ 88.46 (95%CI 82.13-93.83) และพบว่าอัตราการติดเชื้อจากการผ่าตัดในทั้งสอง (กลุ่มผู้ที่ใช้ยาปฏิชีวนะอย่างเหมาะสมกับกลุ่มที่ใช้ยาปฏิชีวนะไม่เหมาะสม) พบว่าไม่มีความแตกต่างอย่างมีนัยสำคัญทางสถิติ (p = 0.529) และไม่มีภาวะแทรกซ้อนจากการได้รับยาปฏิชีวนะ*

สรุป*: อัตราความเหมาะสมของการใช้ยาปฏิชีวนะเพื่อป้องกันการติดเชื้อในการผ่าตัดทางนรีเวช ในโรงพยาบาลศรีนครินทร์ โดยรวมเท่ากับร้อยละ 75.2 (95%CI 69.28-80.33) และพบว่าแพทย์ใช้ทุนและแพทย์ประจำบ้านใช้ยาปฏิชีวนะ อยู่ในเกณฑ์เหมาะสมมากกว่าแพทย์อาวุโส*